

grated in such a manner that it may be difficult to discern a boundary therebetween without using a scanning electron microscope (SEM).

[0044] The multilayer body **110** may have a substantially hexahedral shape. Directions L, W, and T illustrated in FIG. 1 refer to a length direction, a width direction, and a thickness direction, respectively, of the hexahedral shape.

[0045] The multilayer body **110** may contain ferrite known in the art, such as Mn—Zn based ferrite, Ni—Zn based ferrite, Ni—Zn—Cu based ferrite, Mn—Mg based ferrite, Ba based ferrite, Li based ferrite, or the like.

[0046] The internal coil parts **121** and **122** may be formed by printing a conductive paste containing a conductive metal on the insulating layers at a predetermined thickness. The conductive metal forming the internal coil parts **121** and **122** is not particularly limited as long as it has excellent electrical conductivity. For example, the conductive metal may be made of, silver (Ag), palladium (Pd), aluminum (Al), nickel (Ni), titanium (Ti), gold (Au), copper (Cu), platinum (Pt), or the like, or a mixture thereof. In particular, the internal coil parts **121** and **122** may be formed of copper (Cu).

[0047] A via may be formed at a predetermined position in each of the insulating layers on which the internal coil part **121** or **122** is formed, and the internal coil parts **121** and **122** may be electrically connected to each other through the via, thereby forming a single coil. In the illustrated embodiment, since the insulating layers on which the internal coil part **121** or **122** is formed are stacked in the width (W) direction or length (L) direction of the multilayer body **110**, the internal coil parts **121** and **122** may be disposed in a plane perpendicular to a substrate mounting surface of the multilayer body **110**.

[0048] The internal coil part **121** may be a first internal coil part exposed at one end surface of the multilayer body **110** perpendicular to the length (L) direction and the internal coil part **122** may be a second internal coil part exposed at another end surface of the multilayer body **110**, opposite the one end surface, perpendicular to the length direction.

[0049] The first internal coil part **121** includes a first lead portion **121'** exposed at a surface of the multilayer body **110** that is perpendicular to a stacking surface of the multilayer body **110**, and the second internal coil part **122** includes a second lead portion **122'** exposed at a surface of the multilayer body **110** that is perpendicular to the stacking surface of the multilayer body **110**. For example, the first and second lead portions **121'** and **122'** are respectively exposed at opposing end surfaces of the multilayer body **110** perpendicular to the length (L) direction perpendicular to a stacking surface of the insulating layers.

[0050] The first and second lead portions **121'** and **122'** may be exposed at a lower surface of the multilayer body **110**, which is the substrate mounting surface of the multilayer body **110**. That is, first and second lead portions **121'** and **122'** may have an 'L' shape in a cross section of the multilayer body **110** in a length-thickness direction.

[0051] The first external electrode **131** may be disposed on one end surface of the multilayer body **110** perpendicular to the length direction (L) and the lower surface of the multilayer body **110**, and may be connected to the first lead portion **121'**. The second external electrode **132** may be disposed on the other end surface of the multilayer body **110** perpendicular to the length direction and the lower surface of the multilayer body **110**, and may be connected to the second lead portion **122'**. More specifically, the one end

surface and the other end surface of the multilayer body **110** may oppose each other in the length direction (L) and may be perpendicular to the stacking surface of the multilayer body **110**. The one end surface and the second end surface of the multilayer body **110** may be connected to the first and second lead portions **121'** and **122'** of the internal coil parts **121** and **122**, respectively.

[0052] A metal forming the first and second external electrodes **131** and **132** is not limited to a particular type of metal, as long as the metal may be plated. For example, the first and second external electrodes **131** and **132** may be formed of nickel (Ni), tin (Sn), or the like, or a mixture thereof.

[0053] Referring to FIG. 3, a material layer **124** having a specific resistance lower than a specific resistance of the internal coil part is disposed on an outermost (in the width (W) direction) internal coil part among the first and second internal coil parts **121** and **122**.

[0054] In a conventional multilayer inductor, when external electrodes are formed on both end surfaces of a multilayer body perpendicular to a length direction and portions of surfaces of the multilayer body adjacent to both end surfaces by a dipping method using a conductive paste, or by a similar method, a magnetic flux generated by an induced current of a conductor may be blocked, thereby deteriorating the Q factor of the inductor. In particular, in an inductor of which internal coil parts are stacked in a direction perpendicular to a mounting surface of a substrate, in a case in which external electrodes are formed on both end surfaces of the inductor in a length direction, an eddy current may be generated in the external electrodes, which may increase a loss, and stray capacitance may be generated between internal coils and the external electrodes, which may decrease a self resonant frequency of the inductor. Therefore, in a perpendicular multilayer inductor, an attempt has been made to form the external electrodes only on one surface (e.g., a lower surface) of a multilayer body facing a substrate when mounting the inductor on the substrate, or only on end surfaces of the multilayer body perpendicular to a length direction and the lower surface of the multilayer body, to thereby miniaturize the inductor and suppress a loss due to the generation of eddy current.

[0055] Meanwhile, a high-frequency inductor, which is a product having an open magnetic path using a dielectric material, has a problem in that equivalent series resistance of the inductor may increase in a high frequency region due to a loss of magnetic flux and parasitic capacitance generated between internal metals or between internal and external metals, and thus a Q factor of the inductor may deteriorate. In particular, equivalent series resistance (Rs) is represented as a sum of a direct current (DC) resistance which is constant regardless of a change in frequency and an alternating current (AC) resistance of which a magnitude and a value change depending on a change in AC frequency. The AC resistance is increased by a skin effect due to an increase in the AC frequency and a parasitic effect, and equivalent series resistance (Rs) may increase. That is, as an interlayer distance between coils and a distance between the coil and external electrodes are decreased, the equivalent series resistance (Rs) may increase due to the parasitic effect and an increase in parasitic capacitance, and as the frequency is increased, the equivalent series resistance (Rs) may increase due to the skin effect, thereby deteriorating the Q factor. According to the embodiment disclosed herein, the Q factor